

### ABSTRACT

In a power toothbrush, an interchangeable brush head is directly fitted to a front end portion of a drive shaft of an actuator. The actuator comprises a first magnetic circuit for moving the drive shaft reciprocally in an axial direction of the drive shaft, and a second magnetic circuit for rotating the drive shaft around a center axis of the drive shaft. The first magnetic circuit and the second magnetic circuit are independently excited by independent driving current having predetermined frequencies and a predetermined phase difference therebetween. Thus, the brush head fitted to the drive shaft can be moved in a composition of reciprocal linear movement and reciprocal rotation. The actuator does not include conventional mechanical elements such as gears or cams so that the actuator can move the drive shaft much faster than that of the conventional actuator.